

IN THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1(Currently Amended). A multicarrier signal receiver for receiving a serial signal sequence of modulated subcarriers carrying information for input pilot and data symbols, comprising:

a subcarrier-to-symbol converter for converting said serial signal sequence into received pilot and data symbols representative of said input pilot and data symbols; and an inverse Fourier transformer for selecting said received pilot symbols from said received pilot and data symbols and then inverse Fourier transforming said received pilot symbols into received pilot multicarrier blocks

a pilot multicarrier generator for generating a computed pilot multicarrier block having complex conjugates of system pilot symbols corresponding to said input pilot symbols;

a correlator for correlating said received pilot multicarrier blocks with said computed pilot multicarrier block for providing a correlation function;

a frequency offset estimator using said correlation function for providing a frequency synchronization adjustment; and

a signal source for providing a reference signal having a frequency responsive to said frequency synchronization adjustment; wherein:

the subcarrier-to-symbol converter uses said reference signal for frequency synchronizing to said serial signal sequence and providing a frequency synchronized serial signal sequence, said received pilot and data symbols derived from said frequency synchronized serial signal sequence.

2(Original). The receiver of claim 1, wherein:
said modulated subcarriers are an orthogonal frequency division multiplex (OFDM)
signal formed by inverse Fourier transforming said input pilot and data symbols.

3(Original). The receiver of claim 1, wherein:
the subcarrier-to-symbol converter includes a Fourier transformer for Fourier
transforming a representation of said serial signal sequence to said received pilot
and data symbols.

4 – 5. Canceled.

6(Currently Amended). The receiver of claim [[5]] 1, wherein:
the frequency offset estimator includes a peak phase detector for determining phases of
peaks, respectively, of said correlation function; a block differencer for
determining a phase difference between two said phases; and a discriminator for
providing said frequency synchronization adjustment based upon said phase
difference.

7(Currently Amended). The receiver of claim [[5]] 1, wherein:
the frequency offset estimator includes a frequency adjustment sweeper for varying said
frequency synchronization adjustment; and a synch peak detector for monitoring
said correlation function and fixing said frequency synchronization adjustment
when a peak of said correlation function exceeds a threshold.

8(Currently Amended). The receiver of claim [[4]] 1, wherein:
the subcarrier-to-symbol converter includes a time synchronization serial-to-parallel
converter for time synchronizing said serial signal sequence into received
multicarrier blocks according to times of peaks of said correlation function; and a
Fourier transformer for Fourier transforming said received multicarrier blocks into
said received pilot and data symbols.

9(Currently Amended). The receiver of claim [[4]] 1, further comprising:
a discrete noise reduction filter for receiving a raw said correlation function at discrete sample indexes and issuing a filtered said correlation function having filtered peaks at said discrete sample indexes for raw peaks of said raw correlation function greater than a threshold and having a zero level at said discrete sample indexes for said raw peaks of said raw correlation function less than a threshold.

10(Original). The receiver of claim 9, further comprising:
an interpolator for interpolating said filtered correlation function for providing a channel impulse response;
a Fourier transformer for transforming said channel impulse response for forming channel estimates; and
an equalizer for using said channel estimates for equalizing said received pilot and data symbols.

11(Currently Amended). A method for receiving a serial signal sequence of modulated subcarriers carrying information for input pilot and data symbols, comprising:
converting said serial signal sequence into received pilot and data symbols representative of said input pilot and data symbols;
selecting said received pilot symbols from said received pilot and data symbols;
inverse Fourier transforming said received pilot symbols into received pilot multicarrier blocks.
generating a computed pilot multicarrier block having complex conjugates of system pilot symbols corresponding to said input pilot symbols;
correlating said received pilot multicarrier blocks with said computed pilot multicarrier block for providing a correlation function;
converting said correlation function to a frequency synchronization adjustment;
providing a reference signal having a frequency responsive to said frequency synchronization adjustment;
using said reference signal for frequency synchronizing to said serial signal sequence and providing a frequency synchronized serial signal sequence; and

using said frequency synchronized serial signal sequence for providing said received pilot and data symbols.

12(Original). The method of claim 11, further comprising:
inverse Fourier transforming said input pilot and data symbols for forming said modulated subcarriers as an orthogonal frequency division multiplex (OFDM) signal.

13(Original). The method of claim 11, wherein:
converting said serial signal sequence into received pilot and data symbols includes Fourier transforming a representation of said serial signal sequence to said received pilot and data symbols.

16(Currently Amended). The method of claim [[15]] 11, wherein:
converting said correlation function to said frequency synchronization adjustment comprises:
detecting phases of peaks, respectively, of said correlation function;
determining a phase difference between two said phases; and
providing said frequency synchronization adjustment based upon said phase difference.

17(Currently Amended). The method of claim [[15]] 11, wherein:
converting said correlation function to said frequency synchronization adjustment comprises:
varying said frequency synchronization adjustment;
monitoring said correlation function; and
fixing said frequency synchronization adjustment when a peak of said correlation function exceeds a threshold.

18(Currently Amended). The method of claim [[14]] 11, further comprising:
time synchronizing said serial signal sequence into received multicarrier blocks according to times of peaks of said correlation function; and

Fourier transforming said received multicarrier blocks into said received pilot and data symbols.

19(Currently Amended). The method of claim [[14]] **11**, further comprising:
receiving a raw said correlation function at discrete sample indexes; and
issuing a filtered said correlation function having filtered peaks at said discrete sample indexes for raw peaks of said raw correlation function greater than a threshold and having a zero level at said discrete sample indexes for said raw peaks of said raw correlation function less than a threshold.

20(Original). The method of claim 19, further comprising:
interpolating said filtered correlation function for providing a channel impulse response;
Fourier transforming said channel impulse response for forming channel estimates; and
equalizing said received pilot and data symbols based upon said channel estimates.

21 – 44. Canceled.

45 (New). A method of processing a received multicarrier signal, the multicarrier signal comprising a plurality of subcarriers carrying pilot and data symbols, the method comprising:

converting pilot symbols into received pilot multicarrier blocks;
generating a computed pilot multicarrier block having complex conjugates of system pilot symbols corresponding to received pilot symbols;
correlating the received pilot multicarrier blocks with the computed pilot multicarrier block to provide a correlation function;
estimating a frequency offset using the correlation function to provide a frequency synchronization adjustment;
generating a reference signal having a frequency responsive to the frequency synchronization adjustment; and
synchronizing the received multicarrier signal using the reference signal to provide a synchronized received multicarrier signal.

46(New). A method according to claim 45, wherein providing the frequency synchronization adjustment comprises:

detecting phases of peaks, respectively, of the correlation function;
determining a phase difference between two said phases; and
providing said frequency synchronization adjustment based upon said phase difference.

47(New). A method according to claim 45, wherein providing the frequency synchronization adjustment comprises:

varying said frequency synchronization adjustment;
monitoring said correlation function; and
fixing said frequency synchronization adjustment when a peak of said correlation function exceeds a threshold.

48(New). A method according to claim 45, further comprising:

synchronizing the received multicarrier signal to provide a synchronized received multicarrier signal according to times of peaks of said correlation function.

49(New). A method according to claim 45, further comprising:

receiving a raw said correlation function at discrete sample indexes; and
issuing a filtered said correlation function having filtered peaks at said discrete sample indexes for raw peaks of said raw correlation function greater than a threshold and having a zero level at said discrete sample indexes for said raw peaks of said raw correlation function less than a threshold.

50(New). A method according to claim 49, further comprising:

interpolating said filtered correlation function for providing a channel impulse response;
forming channel estimates from said channel impulse response; and
equalizing said pilot and data symbols based upon said channel estimates.